

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listing, of claims in the present patent application:

Listing of Claims:

Claim 1 (currently amended): A method for selecting and modifying the shape of eyeglasses utilizing a system, said method comprising the steps of:

receiving at least one image of a person's face, and storing the received image in an image database;

displaying the stored image to a user;

generating a model of the person's face with the received image;

displaying to the user a plurality of styles of eyeglass frames ~~glass-frames~~ available through the system;

receiving a style selection by the user;

receiving the position of the center of the pupils in the image;

determining the axis of symmetry of the person's face and an approximate contour of the face as an elliptical two-dimensional template;

automatically determining a proper size of the an appropriate size for a selected eyeglass frame by combining the user style selection and the model of the person's face;

[[and]]

generating a virtual image of the person wearing the selected eyeglass frame by superimposing the image of the selected eyeglass frame ~~glass-frame~~ to the image of the face[[.]] and;

permitting the user to interactively modify the selected eyeglass frame.

Claim 2: (currently amended). A method in accordance with Claim 1 wherein said step of determining a proper size of the selected eyeglass frame comprises the step of utilizing a two-dimensional template to determine a position of eyes on the displayed image.

Claim 3: (original). A method in accordance with Claim 1 further comprising the step of refining the position of the center of the pupils to subpixel precision utilizing template matching.

Claim 4 (original): A method in accordance with Claim 1 further comprising the step of determining the position of features on the person's face.

Claim 5 (original): A method in accordance with Claim 1 further comprising the step of receiving a frontal image of the person's face and storing the front image in a database.

Claim 6 (original): A method in accordance with Claim 1 wherein the system includes a server connected to at least one user device, said method further comprising the step of accessing the server via the user device.

Claim 7 (original): A method in accordance with Claim 6 wherein the server is connected to the user device via a network.

Claim 8 (original): A method in accordance with Claim 7 wherein the network is one of the Internet, an intranet, and a wide area network.

Claim 9 (original): A method in accordance with Claim 1 wherein said step of receiving at least one image comprises the step of receiving two or more images of the person's face simultaneously obtained from two or more cameras oriented in a particular configuration.

Claim 10 (original): A method in accordance with Claim 9 further comprising the steps of estimating the epipolar geometry of the configuration of the cameras; and generating a three-dimensional model of the person's face.

Claim 11 (original): A method in accordance with Claim 10 further comprising the steps of:

determining pixel correspondence along scan-lines using normalized correlation with sub-pixel interpolation;

determining the depth corresponding to each pixel utilizing triangulation; and

generating a three-dimensional mesh of the position of the pixels.

Claim 12 (currently amended): A method in accordance with Claim 11 further comprising the steps of:

fitting a three-dimensional template of a face to the generated three-dimensional mesh;

generating an image of the three-dimensional model of the face; and

superimposing the eyeglass frame ~~glass-frame~~ model to the person's face model to generate a virtual image of the person's face wearing the eyeglass frame ~~glass-frame~~.

Claim 13 (currently amended): A method in accordance with Claim 1 further comprising:

representing the shape of the lens using a parameterized curve or a piecewise linear curve where the shape depends upon the position of a number of control points;

representing the shape of the lens and the front rim using a constrained parameterized curve, where in the lens shape depends upon the position of the control points; and

constraining the position of the control points to maintain the perimeter of the rim approximately constant and to maintain the tangent at the hinge and bridge, and the maximum curvature below a prescribed bound determined by the properties of the eyeglass frame.

Claim 14 (currently amended): A method in accordance with Claim 13 further comprising the step of modifying the selected eyeglass frame ~~glass-frame~~ style by changing the position of the control points while maintaining the perimeter approximately constant.

Claim 15 (original): A method in accordance with Claim 13 further comprising the steps of:

maintaining the tangents of the selected eyeglass frame ~~glass-frames~~ at the hinges and bridge constant; and

modifying the selected style to have a prescribed perimeter, while minimizing the distortion from the style selected by the user.

Claim 16 (original): A method in accordance with Claim 1 further comprising the steps of:

associating a position of a set of control points to a set of perceptual qualities stored in a database; and

modifying a shape of the lens ~~the shape of the lens~~ based upon perceptual qualities.

Claim 17 (original): A method in accordance with Claim 16 wherein said step of modifying the shape of the lens comprises the step of modifying the shape of the lens based upon perceptual qualities chosen by the user.

Claim 18 (original): A method in accordance with Claim 17 further comprising the steps of:

storing selected designs;

comparing the stored designs;

performing collaborative filtering; and

recommending to the user shapes and styles according to selections of other customers that best match the choices of the current customer.

Claim 19 (original): A method in accordance with Claim 1 further comprising the step of controlling a lens grinding machine in accordance with data received by the system.

Claim 20 (currently amended): A method in accordance with Claim 1 wherein the system includes a database of maps between the geometry of the eyeglass frame glass-frame, represented by the position of a number of control points, and the perceptual quality of the shape of eyeglasses, said method further comprising the steps of:

modifying the selected shape by specifying the amount of each descriptive quality;

adapting the database to particular clientele; and

performing collaborative filtering to suggest shapes and a style that matches the choices of other customers with potentially similar preferences.

Claim 21 (original): A method in accordance with Claim 20 wherein the database is one of a learning database utilizing psychophysical experiments and empirically established database.

Claim 22 (currently amended): A method in accordance with Claim 1 further comprising the step of modifying the selected style and shape of the eyeglass frame with satisfying constraints due to manufacturing process and inventory.

Claim 23 (currently amended): A method in accordance with Claim 22 further comprising the steps of:

evaluating the constraints within which any given eyeglass frame can be modified; and

enforcing the constraints during eyeglass frame modification.

Claim 24 (original): A method in accordance with Claim 1 further comprising the step of receiving prescription data for the lenses.

Claim 25 (original): A method in accordance with Claim 1 further comprising the step of transmitting the shape and style data to a manufacturer who ships the selected eyeglasses directly to the customer.

Claim 26 (original): A method in accordance with Claim 1 further comprising the steps of:

- selecting landmark points of the person's face;
- tracking the selected points through time as the person moves their head; and
- estimating the three-dimensional motion of the landmark points on-line.

Claim 27 (original): A method in accordance with Claim 1 further comprising the step of generating a two and a half dimensional model.

Claim 28 (original): A method in accordance with Claim 27 further comprising the step of selecting a feature template for relevant facial features.

Claim 29 (currently amended): A method in accordance with Claim 28 further comprising the steps of:

- tracking the position of the feature templates from image frame to image frame;
- and
- selecting a reference frame.

Claim 30 (original): A method in accordance with Claim 29 wherein said step of selecting a reference frame comprises the steps of:

selecting a reference frame from one of a 2-D Euclidean, 2-D Affine, 2-D Projective, and 3-D Euclidean; and
estimating a transformation.

Claim 31 (currently amended): A method in accordance with Claim 30 further comprising the step of using the estimate transformation to modify the appearance of an eyeglass frame ~~a glass-frame~~ template;

Claim 32 (currently amended): A method in accordance with Claim 1 further comprising the step of creating a virtual image of the person's face moving and wearing the eyeglass frame.

Claims 33 - 63 (canceled).